

CLAIMS

1. Communication network protection system made up of interconnected networks of which at least one comprises an automatic control plane and among which are terminal nodes characterized in that with the terminal nodes, termed primary terminal nodes, are associated corresponding secondary terminal nodes, wherein the secondary node is used to realize a protection circuit in case of failure of the associated primary node.
2. Protection system in accordance with claim 1 characterized in that at least one of the interconnected networks comprises an automatic control plane and is interconnected to another of the networks which is protected by one of automatic switching and a control plane.
3. Protection system in accordance with claim 1 or claim 2, characterized in that the primary and secondary terminal nodes comprise origin terminal nodes and corresponding destination terminal nodes for circuits routed between them.
4. Protection system in accordance with claim 3 characterized in that when neither the primary origin node nor the primary destination node have failed, the assembly made up of a primary origin node, a primary destination node and a circuit between them uses an on-the-fly restoration system with the primary origin node playing the role of a controller node and the primary destination node playing the role of a cooperator node.

5. Protection system in accordance with claim 3 characterized in that the primary destination node detects any failure of the primary origin node by means of a failed synchronization attempt therewith.
6. Protection system in accordance with claim 3 characterized in that following a failure of the primary origin node the primary destination node attempts to synchronize with the secondary origin node and, after synchronization, a restoration circuit is established between the secondary origin node and the primary destination node.
7. Protection system in accordance with claim 3 characterized in that the primary origin node detects by means of a failed attempt at synchronization therewith any failure of the primary destination node.
8. Protection system in accordance with claim 3 characterized in that following a failure of the primary destination node the primary origin node attempts to synchronize with the secondary destination node and, after synchronization, a restoration circuit is established between the primary origin node and the secondary destination node.
9. Protection system in accordance with claim 3 characterized in that the primary origin node in its role of coordinator node calculates the routing to the secondary destination node and then implements it through signalling.
10. Protection system in accordance with claim 3 characterized in that for the purpose of providing protection also in case of simultaneous failure of primary

destination and origin nodes, a heartbeat protocol is used between the primary nodes and the corresponding secondary nodes so that each secondary node can detect the failure of the corresponding primary node and a reset circuit can be applied between the secondary nodes.

11. Protection system in accordance with any of claims 3-10, characterized in that the network is made up of two first networks interconnected by a transport network that uses an ASTN control plane with said primary and secondary terminal nodes between the first networks and the transport network.

12. Protection system in accordance with claim 11 characterized in that at least one of said two first networks is made up of a network based on the TMN ITU-T M.3010 management.

13. Protection system in accordance with claim 11 characterized in that at least one of the two first networks is chosen from among MS-SPRing and SNCP.

14. Protection system in accordance with claim 13 characterized in that if one of the two first networks is realized with an MS-SPRing network, the path information of the MS-SPRing network is set in accordance with protection diagrams to indicate in the MS-SPRing network for the circuits to the primary nodes a protection path to the corresponding secondary nodes.

15. Protection system in accordance with claim 13 characterized in that in case of a failure afflicting the primary origin, the corresponding MS-SPRing network switches the client traffic to the secondary origin and the primary destination sends an A message to the primary origin to signal to the primary origin to start an on-the-fly ASTN restoration scheme and, in case of lack of answer by the primary origin, sends a B message to the secondary origin to signal to the secondary origin to start an on-the-fly ASTN restoration mechanism.

16. Protection system in accordance with claim 13 characterized in that at least one of the two first networks is realized with a virtual ring SNCP scheme.

17. Protection system in accordance with claim 16 characterized in that when a failure occurs at a client input of the primary origin, the primary origin declares its unavailability to the associated secondary origin, the primary destination detecting traffic failure starts the restoration to the primary origin and detecting its unavailability starts the ASTN traffic restoration to the secondary origin.

18. Protection system in accordance with claim 16 characterized in that when a failure occurs at the primary origin or destination, the secondary origin or destination switches to the coordinator of the network protection group and realizes an on-the-fly type restoration.

19. Protection system in accordance with claim 13 characterized in that at least one of the two first networks is realized with an SNCP protection scheme with dual ring interconnection protection.
20. Protection system in accordance with claim 16 characterized in that when a failure occurs on the client side of the primary destination and the primary origin one of the primary origin and the primary destination declares their unavailability and switches the protection group to one of the secondary origin and the secondary destination such that the restoration is coordinated through the secondary destination and the secondary origin.
21. Protection system in accordance with claim 16 characterized in that when a failure of the primary origin occurs the secondary origin detects the failure and takes control of the ASTN protection group to restore the connection with the primary destination or, alternatively, with the secondary destination.
22. Protection system in accordance with claim 16 characterized in that following a failure of the ASTN network circuit and of the connection on the client side of the primary origin, the ASTN protection group switches to the secondary origin and the restoration is completed by the secondary destination and origin.
23. Communication networks comprising protection systems in accordance with claims 1 to 22.